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MEMORANDUM

DATE: 2 December 1998

TO: David Bennett, WAM, U.S. EPA, Region X

FROM: Michelle Turner, Chemist, WESTON, Seattle
Rnm Roger McGinnis, Senior Environmental Chemist, WESTON, Seattle

SUBJECT: Validation of Polychlorinated Biphenyls (Congeners) Data
Laboratory Batch: K9805485
Site: Duwamish River

WORK ASSIGNMENT NO. 46-23-0JZZ

WORK ORDER NO.: 4000-019-038-5200-00

DOC. CONTROL NO.: 4000-019-038-AAAK

cc Bruce Woods, RAP-WAM, U.S. EPA, Region X
Dena Hughes, Site Manager, WESTON, Seattle (memo only)
Kevin Mundell-Jackson, Database Management, WESTON, Seattle

The quality assurance review of five sediment samples, laboratory batch K9805485, collected from the Duwamish River has been completed. Samples were analyzed for polychlorinated biphenyls as individual congeners using EPA Method 8082 by Columbia Analytical Services of Kelso, Washington. The samples were numbered:

| | | | | |
|----------|----------|----------|----------|----------|
| 98334057 | 98334058 | 98334059 | 98334060 | 98334061 |
|----------|----------|----------|----------|----------|

Data Qualifications

The following comments refer to the laboratory performance in meeting the quality control criteria described in the technical specifications of the laboratory subcontract. The review follows the format described in the *National Functional Guidelines for Organic Data Review* (EPA OSWER Directive 9240.1-05, February 1994)

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98-06261 004
DCN 4000-019-038-AAAK

2 December 1998
Region X





QA Review Batch K9805485 (PCB Congeners)

Site: Duwamish River

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1. Timeliness

All samples met holding time criteria of 14 days for sample extraction and 40 additional days for extract analysis.

2 Initial Calibration

A six point initial calibration was performed using tetrachloro-meta-xylene (TCMX) as an internal standard. Relative response factors (RRF) were calculated for each target congener. The RRF percent relative standard deviation (%RSD) was less than 20 percent for all analytes.

3 Calibration Verification

Calibration verification standards were analyzed every 12 hours using a midrange standard. The RRF percent difference was less than 25 percent of the initial calibration value.

4. Retention Time Windows

Relative Retention Time Windows were calculated from initial calibration. Retention times for calibration verification standards were within established windows of ± 0.06 RRT.

5 Detection Limits

Instrument detection limits met project required quantitation limits with the following exceptions:

| Sample | Compound | QL Goal ($\mu\text{g/Kg}$) | Reported QL ($\mu\text{g/Kg}$) |
|----------|----------|---------------------------------|-------------------------------------|
| 98334057 | PCB66 | 1 | 7 |
| 98334057 | PCB138 | 1 | 8 |
| 98334058 | PCB66 | 1 | 6 |
| 98334058 | PCB138 | 1 | 8 |
| 98334059 | PCB66 | 1 | 7 |
| 98334059 | PCB138 | 1 | 8 |

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QA Review Batch K9805485 (PCB Congeners)

Site: Duwamish River

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| Sample | Compound | QL Goal (µg/Kg) | Reported QL (µg/Kg) |
|----------|----------|--------------------|------------------------|
| 98334060 | PCB66 | 1 | 4 |
| 98334060 | PCB138 | 1 | 5 |
| 98334061 | PCB66 | 1 | 4 |
| 98334061 | PCB101 | 1 | 2 |
| 98334061 | PCB118 | 1 | 3 |
| 98334061 | PCB153 | 1 | 4 |
| 98334061 | PCB138 | 1 | 5 |
| 98334061 | PCB187 | 1 | 2 |
| 98334061 | PCB180 | 1 | 3 |
| 98334061 | PCB170 | 1 | 2 |

Where quantitation limit goals were exceeded, undetected analytes were qualified (UI) to indicate matrix interference.

6. Blanks

a) Laboratory Method Blanks

Laboratory method blank frequency criteria were met.

No target analytes were reported in laboratory method blanks.

b) Field Blanks

No field blanks were associated with this laboratory batch

7. System Monitoring Compounds (Surrogates)

Hexabromobiphenyl (HBB) was used as a surrogate. The surrogate compound percent recovery met quality control criteria for all samples



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8. Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) or matrix spike duplicate (MSD) percent recovery for the following compounds were outside QC guidelines.

| Sample | Compound | Percent Recovery | QC Limits |
|-------------|----------|------------------|-----------|
| 98334059MS | PCB52 | 57 | 60-140 |
| 98334059MS | PCB66 | 145 | 60-140 |
| 98334059MS | PCB101 | 9 | 60-140 |
| 98334059MS | PCB118 | 54 | 60-140 |
| 98334059MS | PCB153 | 45 | 60-140 |
| 98334059MS | PCB105 | 54 | 60-140 |
| 98334059MS | PCB138 | 158 | 60-140 |
| 98334059MS | PCB187 | 57 | 60-140 |
| 98334059MS | PCB128 | 58 | 60-140 |
| 98334059MS | PCB180 | 43 | 60-140 |
| 98334059MS | PCB170 | 58 | 60-140 |
| 98334059DMS | PCB66 | 163 | 60-140 |
| 98334059DMS | PCB101 | 26 | 60-140 |
| 98334059DMS | PCB153 | 48 | 60-140 |
| 98334059DMS | PCB138 | 175 | 60-140 |
| 98334059DMS | PCB180 | 55 | 60-140 |

All relative percent differences between the MS and MSD recoveries were within QC guidelines. No action was taken based solely on MS/MSD data.

9 Laboratory Control Sample (LCS) Analysis

LCS percent recoveries were outside the QC limits for the following compounds.

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| Sample | Compound | Percent Recovery | QC Limits |
|-------------|----------|------------------|-----------|
| K980820-LCS | PCB18 | 61 | 70-130 |
| K980820-LCS | PCB28 | 66 | 70-130 |
| K980820-LCS | PCB52 | 63 | 70-130 |
| K980820-LCS | PCB44 | 64 | 70-130 |
| K980820-LCS | PCB101 | 64 | 70-130 |
| K980820-LCS | PCB81 | 64 | 70-130 |
| K980820-LCS | PCB123 | 67 | 70-130 |
| K980820-LCS | PCB114 | 67 | 70-130 |
| K980820-LCS | PCB153 | 67 | 70-130 |
| K980820-LCS | PCB105 | 67 | 70-130 |
| K980820-LCS | PCB138 | 63 | 70-130 |
| K980820-LCS | PCB187 | 66 | 70-130 |
| K980820-LCS | PCB128 | 66 | 70-130 |
| K980820-LCS | PCB167 | 69 | 70-130 |
| K980820-LCS | PCB156 | 66 | 70-130 |
| K980820-LCS | PCB157 | 64 | 70-130 |
| K980820-LCS | PCB180 | 67 | 70-130 |
| K980820-LCS | PCB170 | 67 | 70-130 |
| K980820-LCS | PCB189 | 67 | 70-130 |
| K980820-LCS | PCB195 | 66 | 70-130 |

Results for compounds listed above were qualified as estimated (J). Undetected compounds were also qualified as estimated (UJ).

10 Field Duplicate Analysis

No field duplicates were associated with this SDG.

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Site: Duwamish River

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11. Second Column Confirmation

The relative percent difference (RPD) in reported analyte concentration was greater than 35 percent for the primary and confirmation column for the following samples:

| Sample Number | Compound | DB-5 Conc (µg/Kg) | DB-608 Conc (µg/Kg) | RPD |
|---------------|----------|----------------------|------------------------|-----|
| 98334057 | PCB28 | 1 | 3 | 100 |
| 98334057 | PCB52 | 3 | 5 | 50 |
| 98334057 | PCB101 | 2 | 3 | 40 |
| 98334057 | PCB138 | 8 | 4 | 67 |
| 98334058 | PCB187 | 2 | 3 | 40 |
| 98334058 | PCB170 | 3 | 2 | 40 |
| 98334059 | PCB28 | 2 | 3 | 40 |
| 98334059 | PCB101 | 2 | 4 | 67 |
| 98334059 | PCB138 | 7 | 4 | 55 |
| 98334060 | PCB52 | 2 | 3 | 40 |
| 98334060 | PCB138 | 5 | 3 | 50 |
| 98334060 | PCB180 | 3 | 2 | 40 |
| 98334061 | PCB52 | 2 | 3 | 40 |
| 98334061 | PCB38 | 4 | 2 | 67 |

Differences can arise from analytical interferences on one column. However, the RPDs are not deemed significant at the reported concentrations. The lower concentration was reported for each analyte, unless interferences or coelution prevented use of the lower concentration.

12. Sample Analysis

A cursory review of raw data was performed. All laboratory deliverables were present and complete. A duplicate analysis was performed as Batch QC. RPD values for PCB28, PCB44, PCB101, PCB118, PCB153, PCB187, PCB180 and PCB170 were high, although no QC limits for sample replicates have been established. The case narrative indicates that the high RPDs resulted when analyte concentrations were at or near the method

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reporting limit No qualifiers were assigned based on duplicate results as Batch QC may not accurately represent samples in this SDG. The case narrative also notes that several congeners in the LCS and batch MS/MSD did not meet QC requirements and were flagged as such. No other complications were noted.

13 Laboratory Contact

The laboratory was not contacted.

Data Assessment

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values

Data Qualifiers

- U - The compound was analyzed for, but was not detected
- UJ - The compound was analyzed for, but was not detected. The associated quantitation limit is an estimate because quality control criteria were not met
- J - The analyte was positively identified, but the associated numerical value is an estimated quantity because quality control criteria were not met or because concentrations reported are less than CRDL or lowest calibration standard
- R - Quality control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.
- N - Presumptive evidence of presence of material (tentative identification).
- I - Elevated reporting limit due to matrix interference.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
 Project: Duwamish River/4000-027-001-2019-38
 Sample Matrix: Sediment

Service Request: K9805485
 Date Collected: 8/13/98
 Date Received: 8/14/98

Congener Specific PCBs

Sample Name 98334057
 Lab Code K9805485-001
 Test Notes

Units: ug/Kg (ppb)
 Basis Dry

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---------|-------------|-----------------|-----|-----------------|----------------|---------------|---------|--------------|
| PCB 18 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 28 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 52 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 J | |
| PCB 44 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 66 | EPA 3550B | 8082 | 7 | 1 | 8/20/98 | 8/27/98 | ND 7 uJ | |
| PCB 101 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 J | |
| PCB 81 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 77 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 123 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 118 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 | |
| PCB 114 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 153 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 5 J | |
| PCB 105 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 138 | EPA 3550B | 8082 | 8 | 1 | 8/20/98 | 8/27/98 | ND 8 uJ | |
| PCB 126 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 187 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 128 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 167 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 156 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 157 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 180 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 J | |
| PCB 169 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 170 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 189 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 195 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 206 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 209 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |

B

The MRL is elevated because of matrix interferences

mgf 11/1/98

Approved By *Jay*
 1544021397p

Date 9-4-98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
 Project: Duwamish River/4000-027-001-2019-38
 Sample Matrix: Sediment

Service Request: K9805485
 Date Collected: 8/13/98
 Date Received: 8/14/98

Congener Specific PCBs

Sample Name 98334058 Units ug/Kg (ppb)
 Lab Code K9805485-002 Basis Dry
 Test Notes

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---------|-------------|-----------------|-----|-----------------|----------------|---------------|---------|--------------|
| PCB 18 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 28 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 52 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 J | |
| PCB 44 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 66 | EPA 3550B | 8082 | 6 | 1 | 8/20/98 | 8/27/98 | ND 6 uJ | β |
| PCB 101 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 81 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 77 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 123 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 118 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 | |
| PCB 114 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 153 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 5 J | |
| PCB 105 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 138 | EPA 3550B | 8082 | 8 | 1 | 8/20/98 | 8/27/98 | ND 8 uJ | J β |
| PCB 126 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 187 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 128 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 167 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 156 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 157 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 180 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 J | |
| PCB 169 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 170 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 189 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 195 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 206 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 209 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |

B

The MRL is elevated because of matrix interferences

Approved By
 1544021397p

Date

9-4-98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
 Project: Duwamish River/4000-027-001-2019-38
 Sample Matrix: Sediment

Service Request: K9805485
 Date Collected: 8/13/98
 Date Received: 8/14/98

Congener Specific PCBs

Sample Name 98334059 Units ug/Kg (ppb)
 Lab Code K9805485-003 Basis Dry
 Test Notes

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---------|-------------|-----------------|-----|-----------------|----------------|---------------|---------|--------------|
| PCB 18 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 28 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 52 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 J | |
| PCB 44 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 66 | EPA 3550B | 8082 | 7 | 1 | 8/20/98 | 8/27/98 | ND 7 uJ | 8 |
| PCB 101 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 J | |
| PCB 81 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 77 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 123 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 118 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 | |
| PCB 114 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 153 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 5 J | |
| PCB 105 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 138 | EPA 3550B | 8082 | 8 | 1 | 8/20/98 | 8/27/98 | ND 8 uJ | 8 |
| PCB 126 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 187 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 128 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 167 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 156 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 157 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 180 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 4 J | |
| PCB 169 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 170 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 189 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 195 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 206 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 209 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |

B

The MRL is elevated because of matrix interferences

Approved By
 1544021397p

Date

9-4-98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805485
Date Collected: 8/13/98
Date Received: 8/14/98

Congener Specific PCBs

Sample Name 98334060 Units ug/Kg (ppb)
 Lab Code K9805485-004 Basis Dry
 Test Notes

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---------|-------------|-----------------|-----|-----------------|----------------|---------------|--------|--------------|
| PCB 18 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 28 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 52 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 44 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 66 | EPA 3550B | 8082 | 4 | 1 | 8/20/98 | 8/27/98 | ND 4uJ | |
| PCB 101 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 81 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 77 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 123 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 118 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 | |
| PCB 114 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 153 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 3 J | |
| PCB 105 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 138 | EPA 3550B | 8082 | 5 | 1 | 8/20/98 | 8/27/98 | ND 5uJ | |
| PCB 126 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 187 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 128 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 167 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 156 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 157 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 180 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 169 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 170 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 189 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 195 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1uJ | |
| PCB 206 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 209 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |

B

The MRL is elevated because of matrix interferences

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1544021397p

Date

9-4-98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
 Project: Duwamish River/4000-027-001-2019-38
 Sample Matrix: Sediment

Service Request: K9805485
 Date Collected: 8/13/98
 Date Received: 8/14/98

Congener Specific PCBs

Sample Name 98334061
 Lab Code K9805485-005
 Test Notes

Units ug/Kg (ppb)
 Basis Dry

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---------|-------------|-----------------|-----|-----------------|----------------|---------------|---------|--------------|
| PCB 18 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 28 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 52 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 2 J | |
| PCB 44 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | 1 J | |
| PCB 66 | EPA 3550B | 8082 | 4 | 1 | 8/20/98 | 8/27/98 | ND 4 uJ | B |
| PCB 101 | EPA 3550B | 8082 | 2 | 1 | 8/20/98 | 8/27/98 | ND 2 uJ | B |
| PCB 81 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 77 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 123 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 118 | EPA 3550B | 8082 | 3 | 1 | 8/20/98 | 8/27/98 | ND 3 uJ | B |
| PCB 114 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 153 | EPA 3550B | 8082 | 4 | 1 | 8/20/98 | 8/27/98 | ND 4 uJ | B |
| PCB 105 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 138 | EPA 3550B | 8082 | 5 | 1 | 8/20/98 | 8/27/98 | ND 5 uJ | B |
| PCB 126 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 187 | EPA 3550B | 8082 | 2 | 1 | 8/20/98 | 8/27/98 | ND 2 uJ | B |
| PCB 128 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 167 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 156 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 157 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 180 | EPA 3550B | 8082 | 3 | 1 | 8/20/98 | 8/27/98 | ND 3 uJ | B |
| PCB 169 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 170 | EPA 3550B | 8082 | 2 | 1 | 8/20/98 | 8/27/98 | ND 2 uJ | B |
| PCB 189 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 195 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND 1 uJ | |
| PCB 206 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |
| PCB 209 | EPA 3550B | 8082 | 1 | 1 | 8/20/98 | 8/27/98 | ND | |

B

The MRL is elevated because of matrix interferences

Approved By 
 1544021397p

Date 9-4-98